Real Time Data and Forecasting Project
Water Quality Weekly Report
Volume 3, Issue 20; Tuesday, 16 May 2006
Office of Water Quality, Department of Water Resources

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1. Summary Comments, Observations and Interpretation

This issue reprints updated versions of the volumetric, EC, and DOC fingerprint models, courtesy of the Bay-Delta Office modeling group (page 5), which appeared first last week. Since the water quality fingerprints are based on automated real-time data that is subject to revision and change, some of the values for November – February presented in this update have changed slightly from previous DSM2 water quality fingerprints and from raw CDEC values. The water quality input used in the fingerprints was based on CDEC computed daily average values. Though the data was screened for obvious errors, some of the model input data was not identical to the QA/QCed data presented in the RTDF reports. Instead previous reports were used to flag errors in the raw CDEC daily data and aid in the creation of appropriate boundary time-series data.

The most obvious feature in the updated fingerprints is the strong shift in January to the San Joaquin River as the dominant contributor of water to Banks. This contribution has continued. In the EC fingerprint, the model and observed values at Banks agree very well. In the DOC fingerprint, 2006 modeled and observed values generally agree except for a few episodes, most notably in February. While several instrument anomalies were removed during the period, the offset in observed values remain, and an empirical check against observed UV-A absorption measurements at Banks suggested that the DOC values measured by combustion analysis are reasonable. Similarly, the anomaly in mid-April appears to be real. We will continue to investigate, as these features ultimately provide information that will improve our understanding of the Delta.

After being above 90,000 cfs for 68 days, Delta Total Outflow (DTO) dropped to 87,884 cfs on 10 May 2006. Of course that is still no small amount since it would fill Folsom Reservoir in less than six days. Including the most recent days the total for the 73 day period was 20,477,696 acre-feet. This would fill all the major reservoirs in the Central Valley including the San Luis storage reservoir.

During the month of May there has been no precipitation at any of the six stations included in this report. For the entire 4-week reporting period none of the stations has had as much as one inch. The high flows are probably the result of snow melt in the Sierra, many of them passed along by the reservoirs.

Flow in the Sacramento River at Freeport decreased from 70,341 cfs on 4 May to 57,408 cfs on the 9th. Since then it has changed little, and it was 55,621 cfs on 14 May. Mean daily EC at Hood has been historically low during the entire reporting period. The minimum was 82 µS/cm on 18 April, rising to a maximum of 113 µS/cm on 9 May, then decreased to 95 µS/cm by the 14th.

Flow in the San Joaquin River near Vernalis has also decreased significant recently, but mean daily flow of 26,858 cfs on May 14th was still more than 3.6 times greater than the long-term mean of approximately 7390 cfs. Record low EC values accompanied the high flow values, and mean daily ECs were actually lower than the values in the Sacramento River at Hood on ten days of the reporting period. The maximum mean daily EC was 139 µS/cm on April 17th dropping to a minimum of 93 µS/cm on 8 May. The value on the 14th was 95 µS/cm.

On days with complete EC data at the H. O. Banks Pumping Plant, the maximum mean daily EC was 187 µS/cm on 19 April falling to a minimum of 132 µS/cm on 2 May. The value rose slightly to end the reporting period at 149 µS/cm on the 14th. The Vernalis Adaptive Management Program (VAMP) got underway on 4 May. In this program the combined pumping by DWR and USBR should total approximately 1,500 cfs. The intent is to help the juvenile Chinook salmon get through the Delta and ultimately to the Pacific Ocean. The high flows in the San Joaquin River prevented construction of the barrier at the head of Old River as is usually done as a part of VAMP.

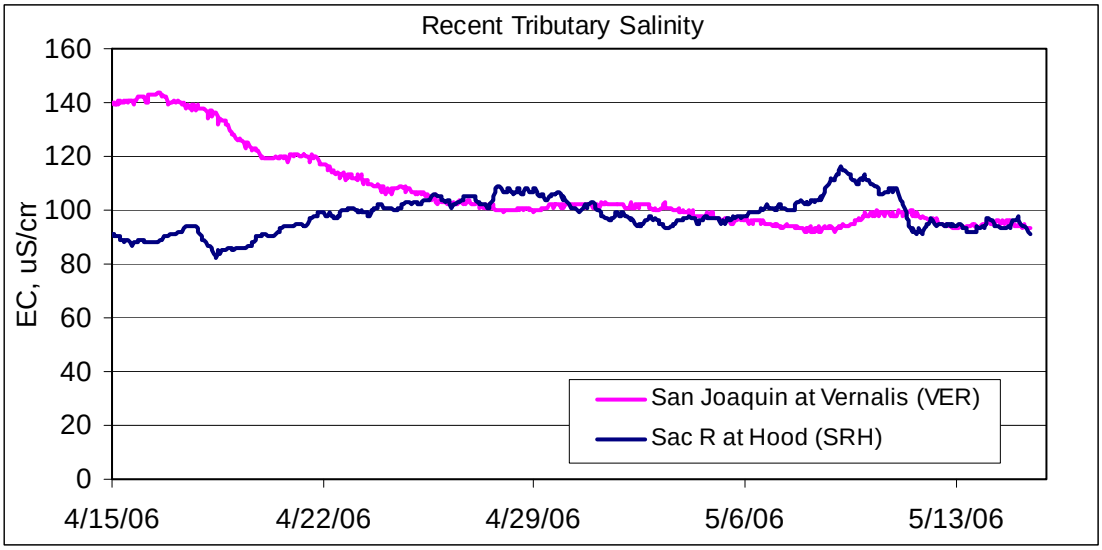
Summary Comments, continued

The TOC (combustion) analyzer at the Hood station measured a maximum mean daily value of 2.51 mg/L on 17 April, decreasing to a minimum of 1.56 mg/L on 5 May. The instrument stopped working on the 14th, but the value on the 13th was 1.82 mg/L. The TOC (oxidation) instrument had no problems, and the maximum mean daily was 2.32 mg/L on April 17th and 19th, followed by a more recent bump to 2.02 on 9 May, before falling to a minimum of 1.57 mg/L on the 14th.

The TOC (combustion) instrument at the Vernalis station lost data briefly during the night of May 11-12. Other than that it functioned properly and had a maximum mean daily value of 4.12 mg/L on April 17th dropping to a minimum value of 2.66 mg/L on 14 May. DOC (combustion) at Vernalis has also dropped, ending at 1.97 mg/L on 14 May. The reservoir releases seem to be rinsing the San Joaquin watershed.

The TOC (combustion) instrument at the H. O. Banks Pumping Plant functioned quite well through the entire period. The maximum mean daily TOC was 5.12 mg/L on April 17th, dropping to a minimum of 3.53 mg/L on the 14th. DOC has followed a similar trend, ending at 2.98 mg/L on 14 May. This decreasing trend is likely to continue as the San Joaquin pushes the somewhat higher OC water out of the Delta.

As mentioned on the previous page, the San Joaquin River has exhibited record low salinity values in recent weeks. Since 25 April, the Sacramento (usually the lower EC of the two) and the San Joaquin have been taking turns with the title of lowest EC major tributary to the Delta.



The San Joaquin's record low EC concentration in recent weeks (see Vol. 3 Issue 18) has been thanks to high flows of very low salinity in the tributary streams (e.g., EC in the Tuolumne River at Modesto (MOD) is currently 38 µS/cm). With this year's far-above-normal snow-pack, these low salinity levels are likely to continue for quite some time.

Table of Contents Page

2. Important Information for this Week

The EC model runs are based on the following assumptions for the period from 5/10 thru 5/30: (1) Delta Cross Channel gates remain closed; (2) CCFB gates operated on priority 3 schedule (least restrictive, gates open except during lower-low water and rising edge of higher-high water flood tide); (3) No barriers in place; and (4) 79 µS/cm of EC on SJR at Vernalis per San Joaquin District's forecast. The modeling results suggest high water level and low EC on every channel analyzed thru the end of May.

The combustion organic carbon analyzer at Hood had short episodes of malfunction during the first two weeks of May. The TOC (combustion) instrument at the Vernalis station lost data on May 11th and 12th. The daily values reported were calculated from the uncontaminated event data.

EC for Tuolumne River at Modesto was omitted on 04/23 and 05/07-05/09.

Precipitation at Exchequer Dam in the San Joaquin watershed has been reported as the daily incremental data available on CDEC, which was not available for several days in the previous week. The reported precipitation was calculated from tipping bucket data at the same station.

Vallecitos data were not available after 10 May. NBV EC malfunctioned on 22 April, was estimated to be 320 µS/cm. CAA UVA at Edmonton Pumping Plant was unavailable 05/04-05/08.

3. General Information

This weekly water quality report is produced by the Department of Water Resources, Office of Water Quality. Any questions, comments or suggestions are welcome. Please contact Ted Swift by E-mail at: tswift@water.ca.gov or by phone at: (916) 651-9694. Each weekly issue is sent out electronically as an E-mail attachment in Adobe Acrobat format. The corresponding data are also sent out electronically as an attached EXCEL XP file. This report is part of the Real Time Data and Forecasting (RTDF) project. The goal is to bring real time, near real time, and forecasted water quality data to source water managers, treatment plant operators, scientists, and other stakeholders.

If you find the information useful, feel free to share it with others. If you wish not to receive this report in the future, please contact Ted Swift and you will be remove from the address list. Conversely, anyone interested in receiving this report can send a request to be added to the list.

This weekly report is a work in progress. The RTDF Steering Committee has provided guidance and the report will continue to evolve and provide more useful information.

Calculated Delta Inflow (Section 11) is the sum of CDEC flow data from the following stations:

- Sacramento River at Freeport
- San Joaquin River near Vernalis
- Yolo Bypass near Woodland
- Cosumnes River at Michigan Bar
- Mormon Slough at Bellota (Calaveras River)
- Camanche Reservoir (Mokelumne River)

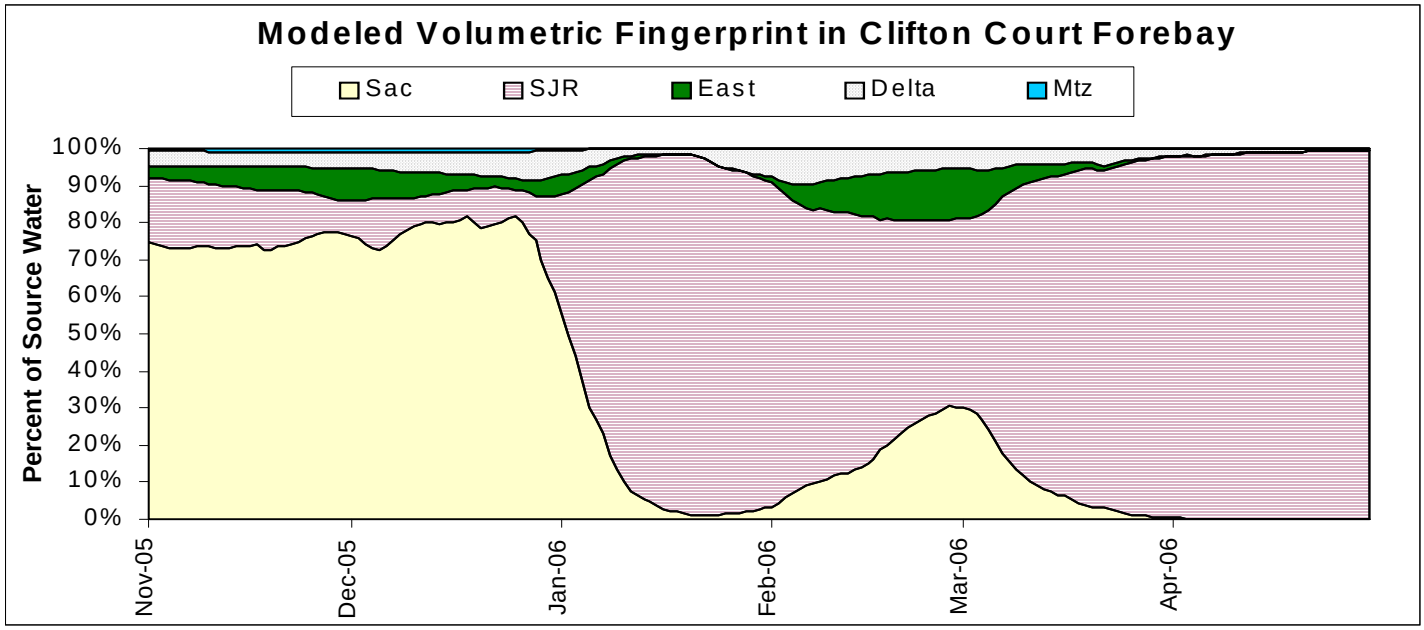
Useful links:

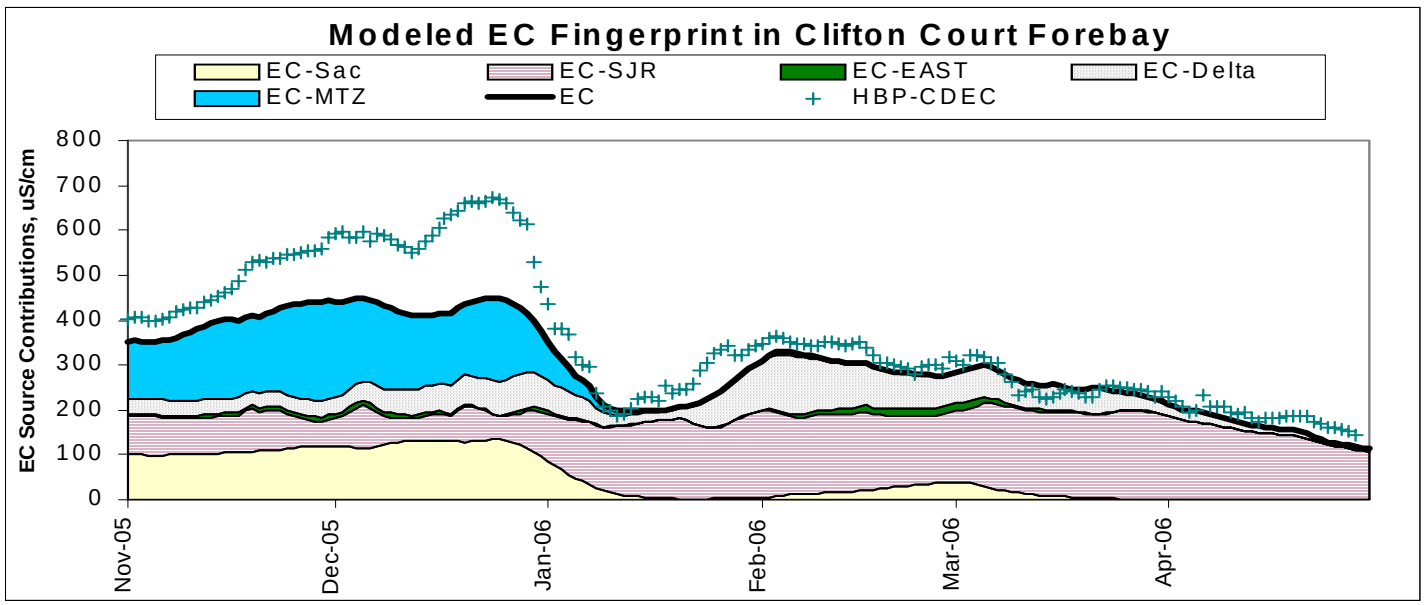
Station Meta Data, Maps and Related Data at	http://cdec.water.ca.gov/staMeta.html
CDEC Plotter at	http://cdec.water.ca.gov/cgi-progs/histPlot
Other Historical Water Quality Data at	http://wdl2.water.ca.gov/mwqi/
IEP Maps of Delta Monitoring Stations	http://www.iep.ca.gov/dss/all/

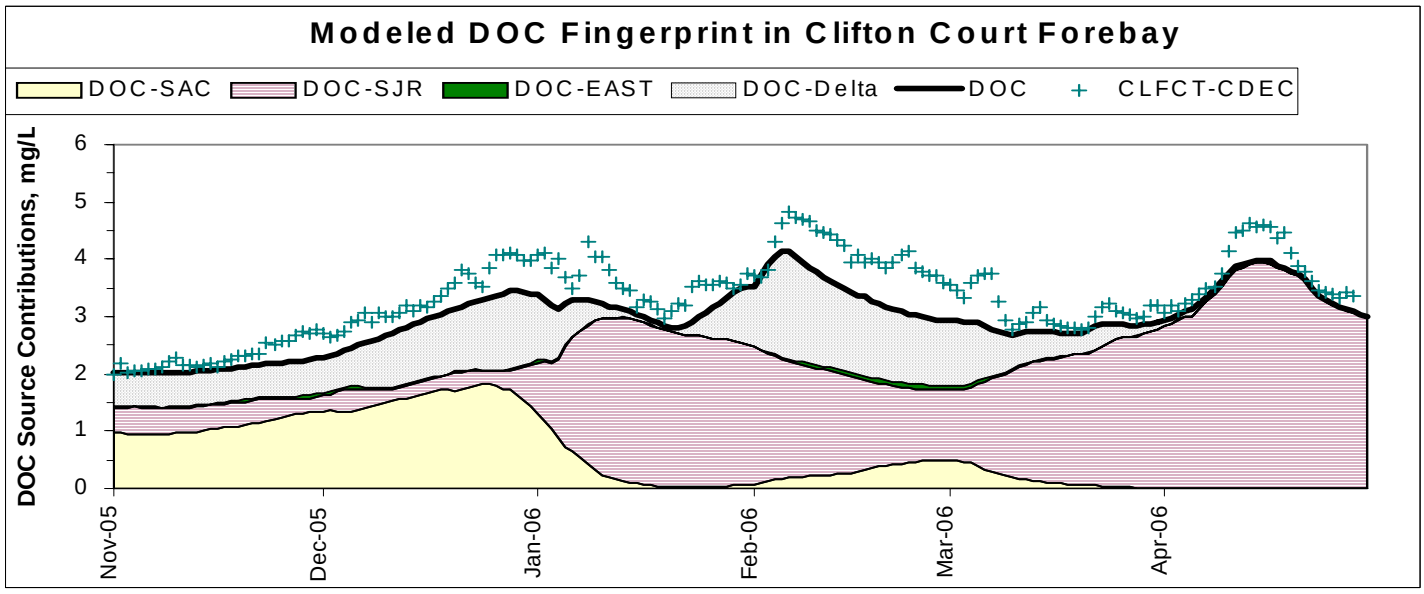
This report contains preliminary data and is subject to revision.

All figures except the EC forecasts and San Luis Storage represent mean daily data.

4. Volumetric and Constituent Fingerprints

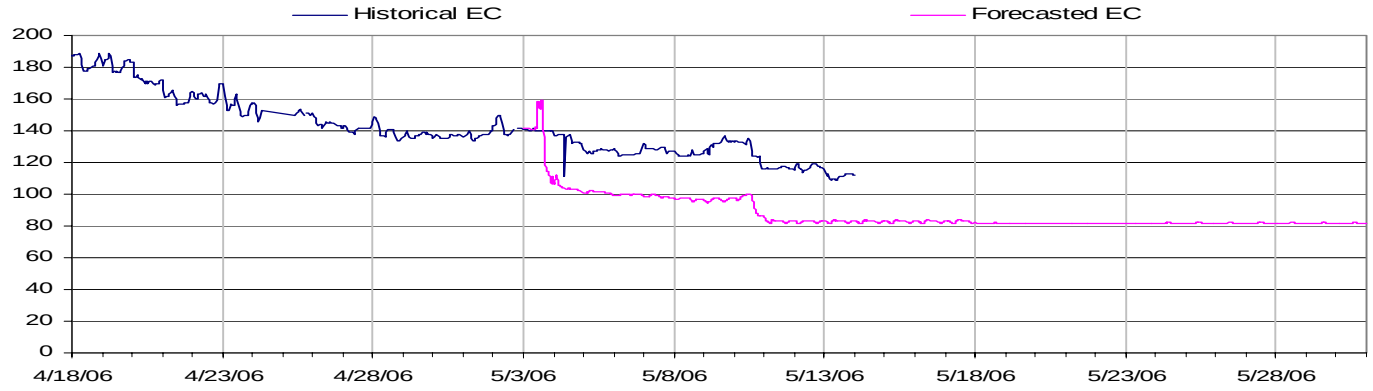




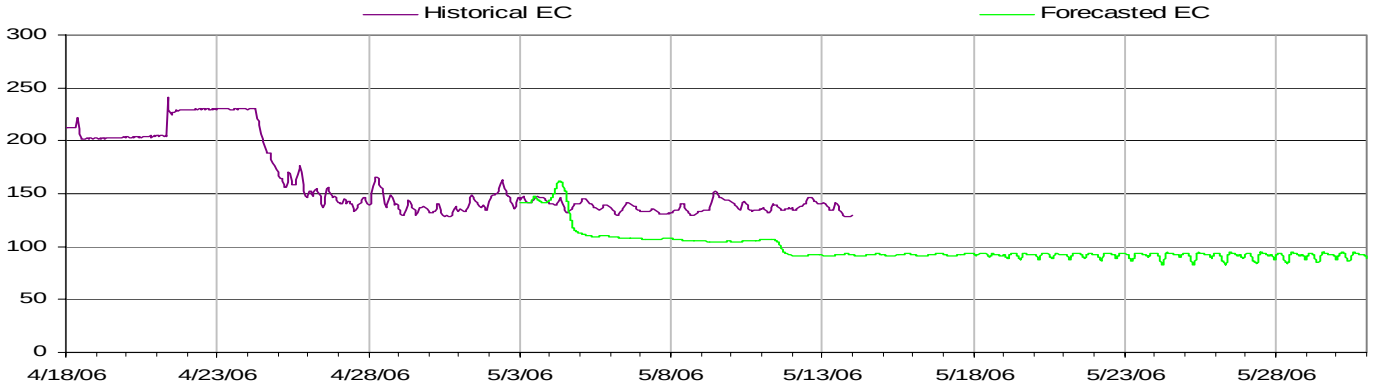


5. Forecasted EC—Diversion and Export Locations

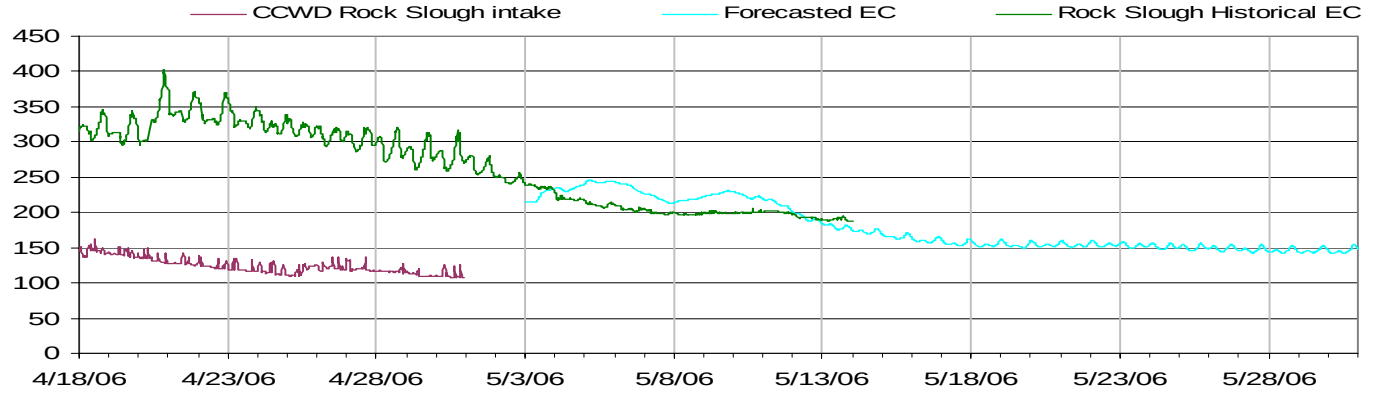
Old River at Clifton Court Gates (µS/cm)



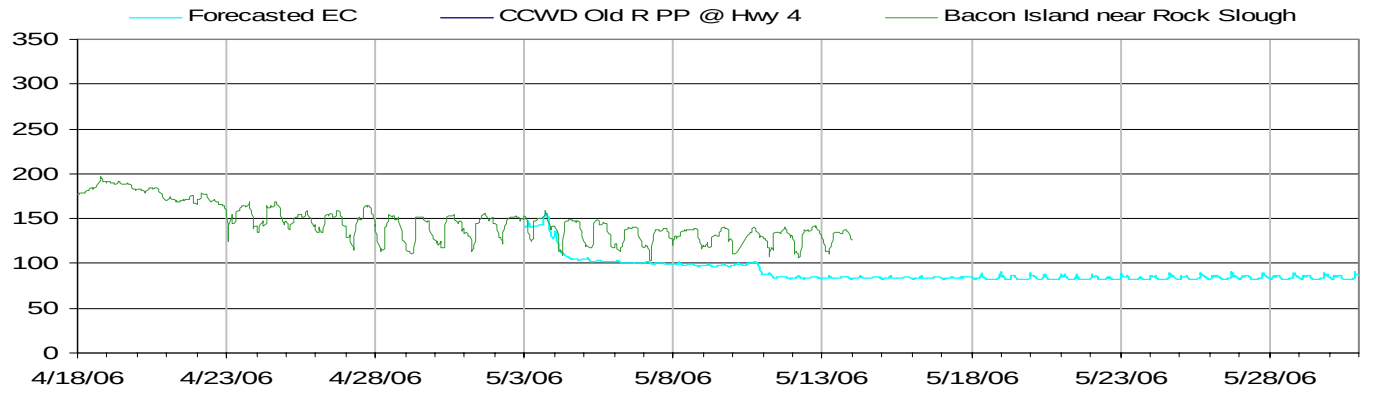
Delta Mendota Canal/Tracy P.P. (µS/cm)



Rock Slough (µS/cm)

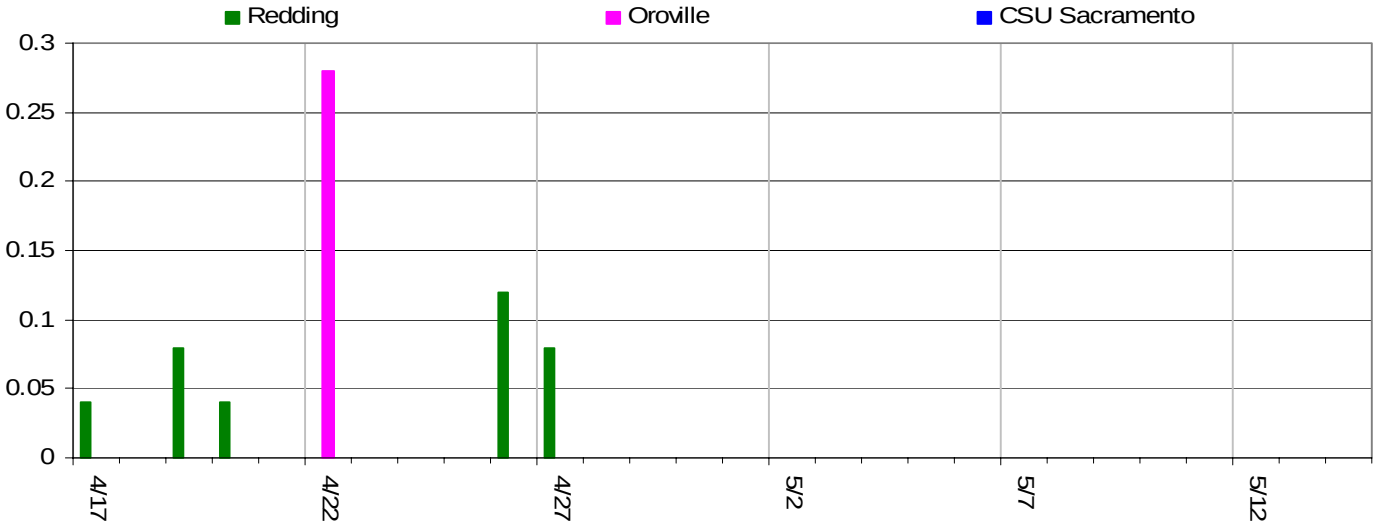


Old River at Los Vaqueros Reservoir Intake (µS/cm)

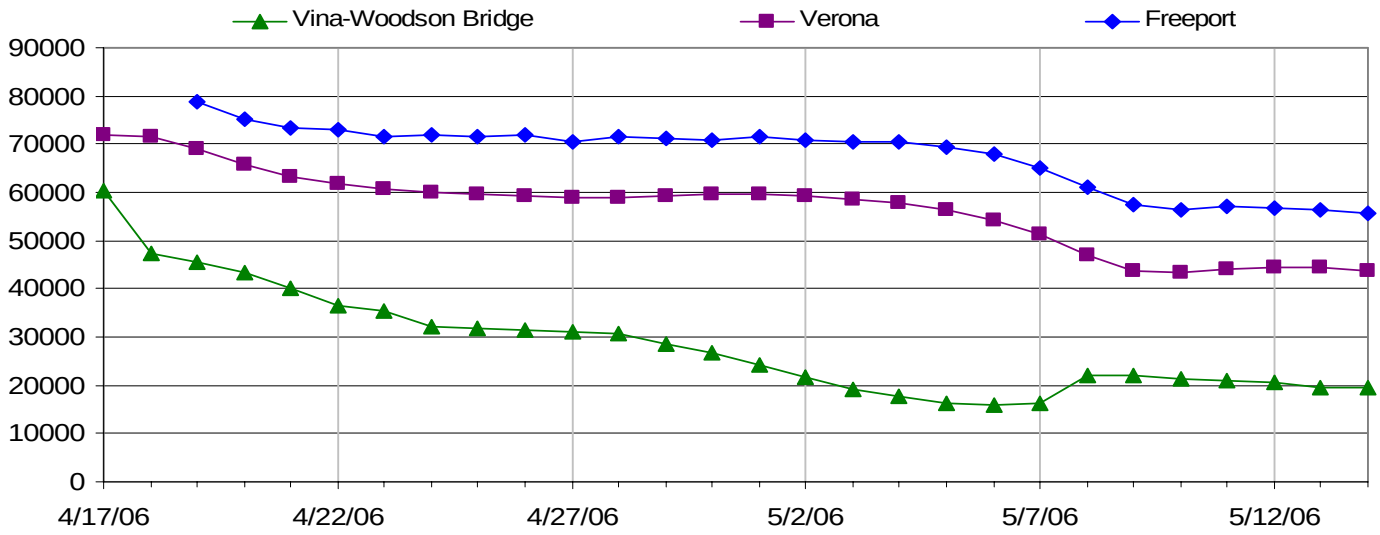


6. Precipitation, Flow & Electrical Conductivity—Sacramento River

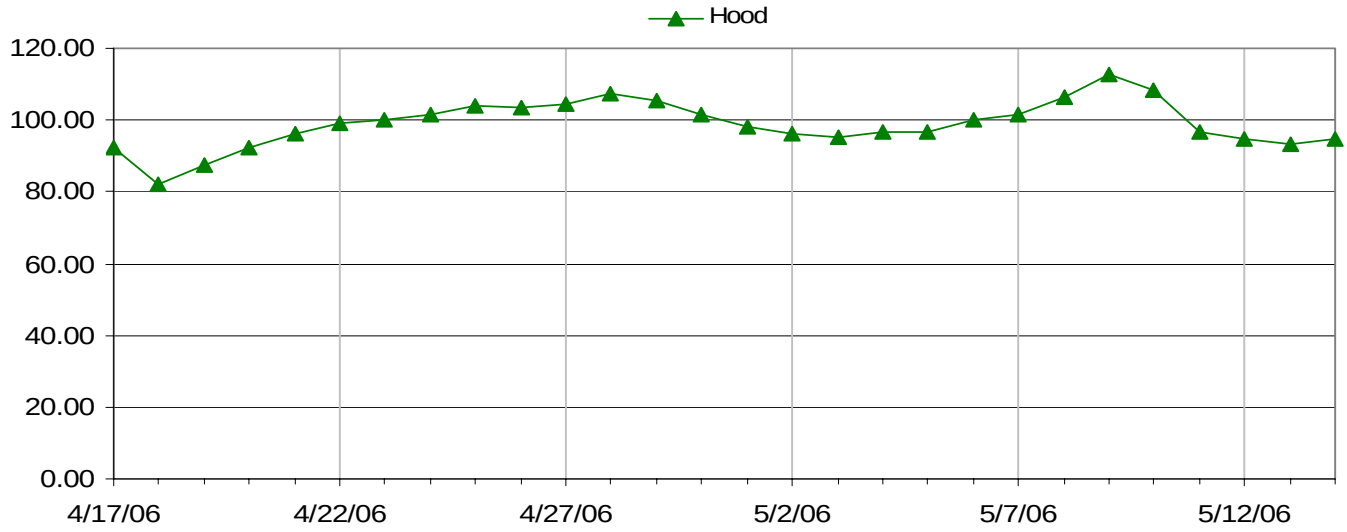
Sacramento River Watershed Precipitation (inches)



Sacramento River Flows (cfs)

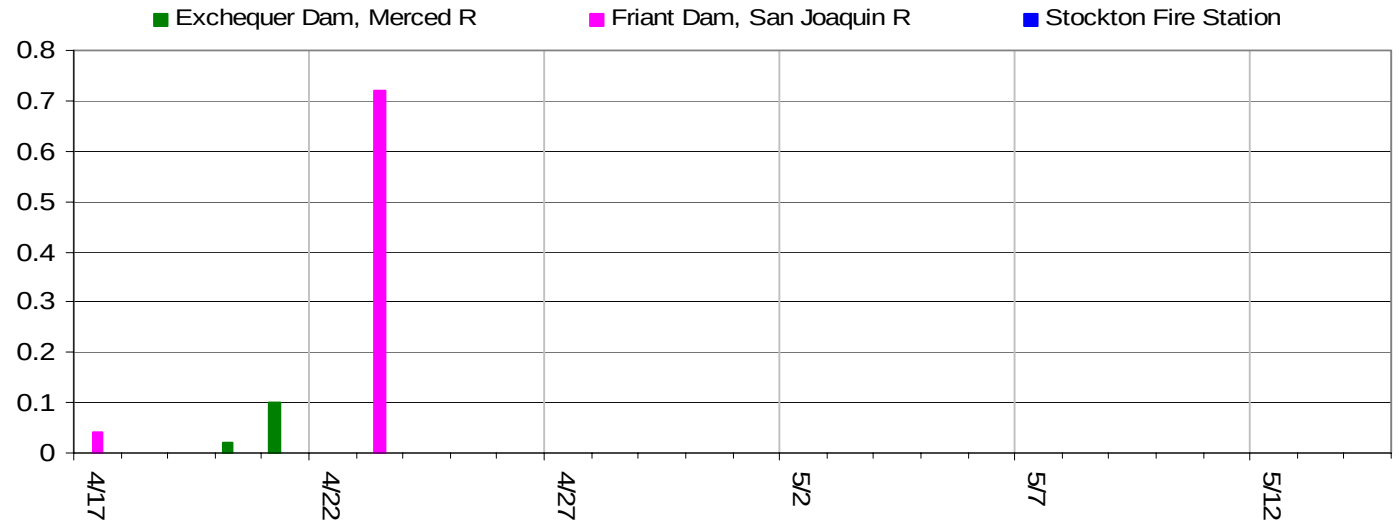


Sacramento River Electrical Conductivity (µS/cm)

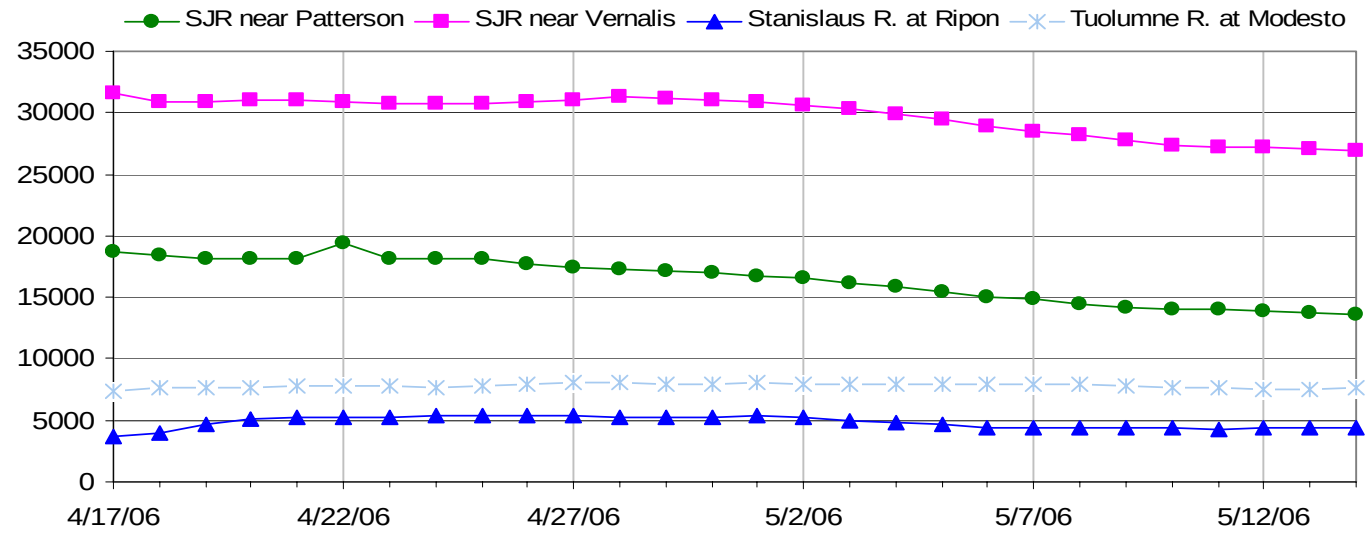


7. Precipitation, Flow & Electrical Conductivity—San Joaquin River

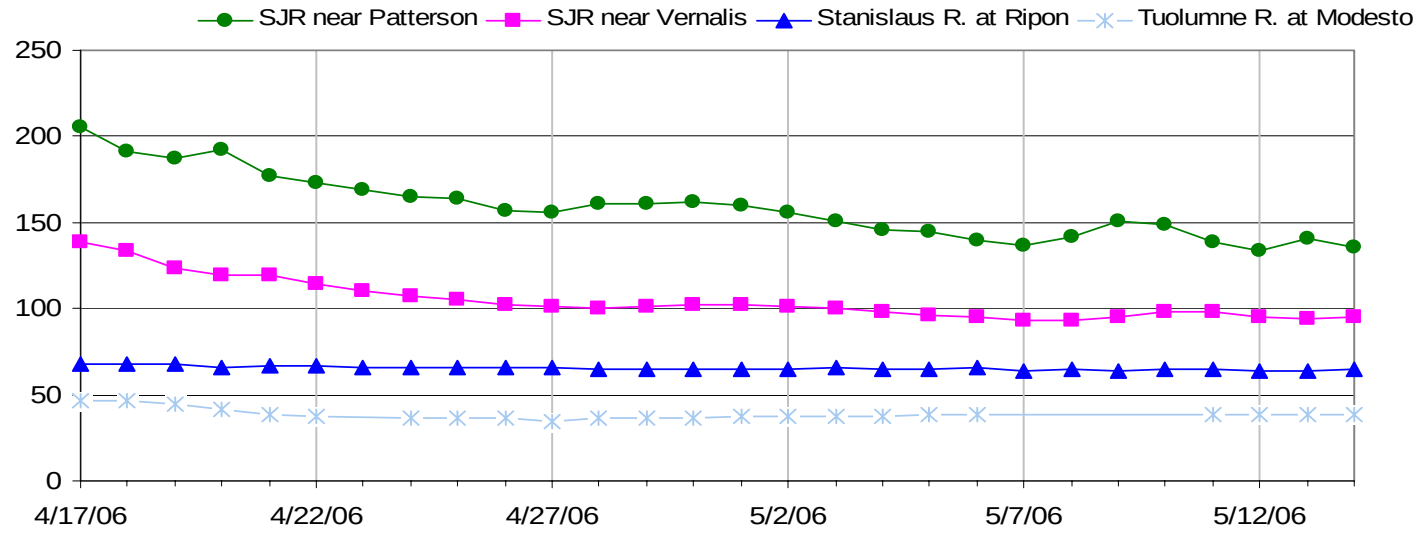
San Joaquin River Watershed Precipitation (inches)



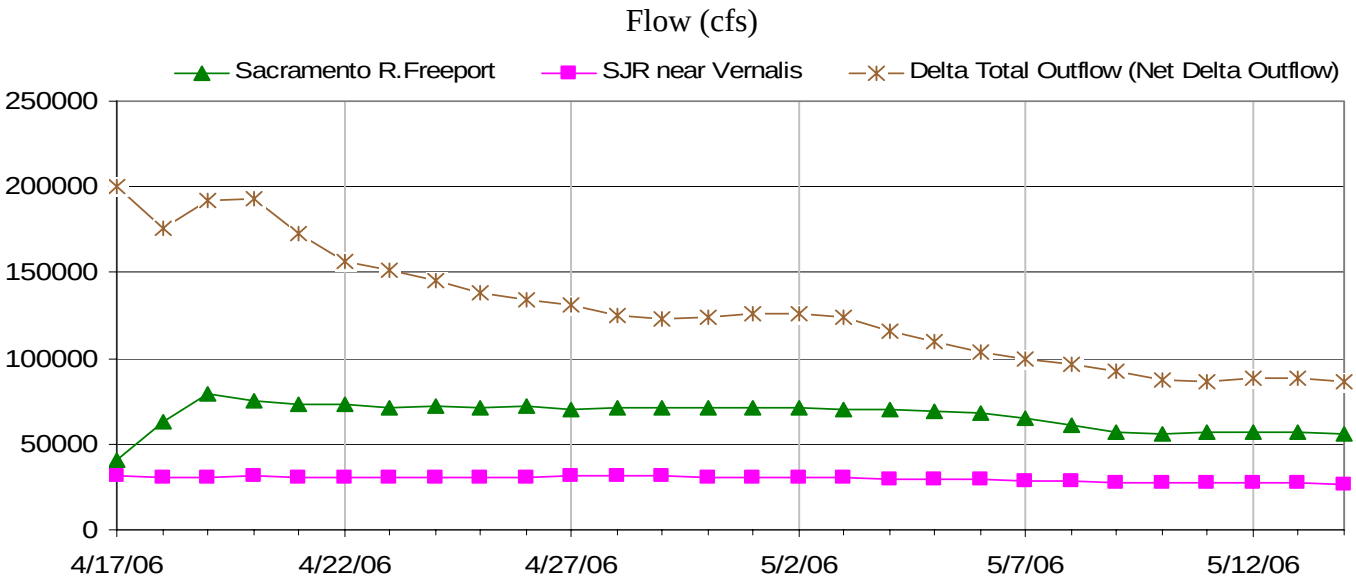
San Joaquin River Flows (cfs)

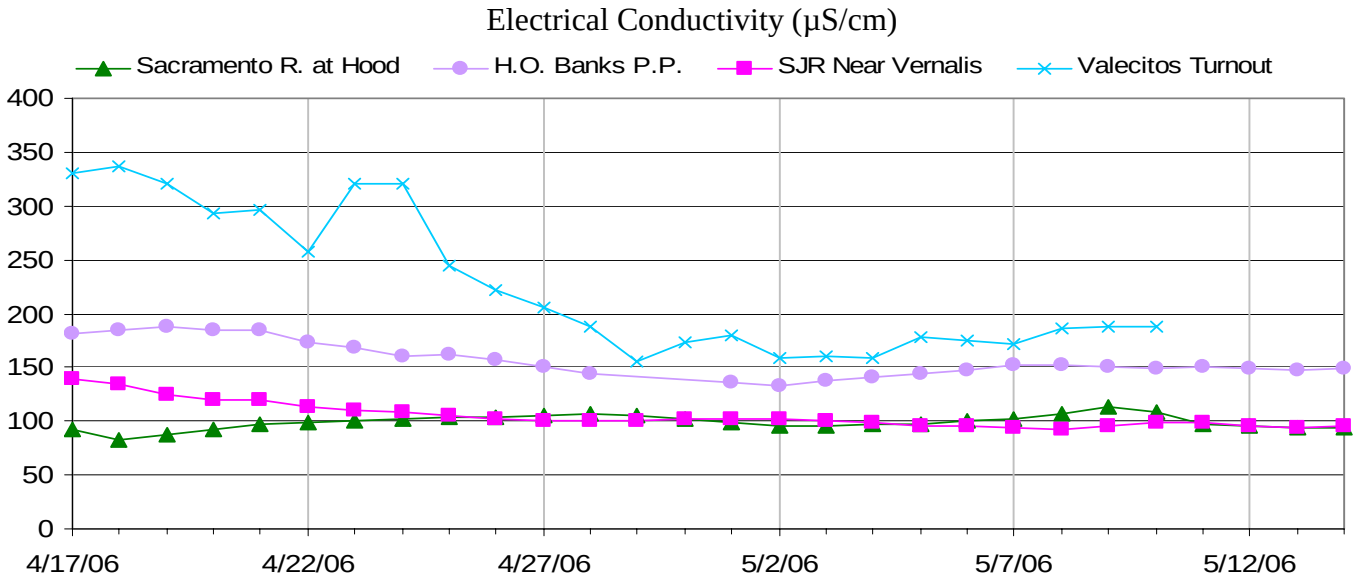


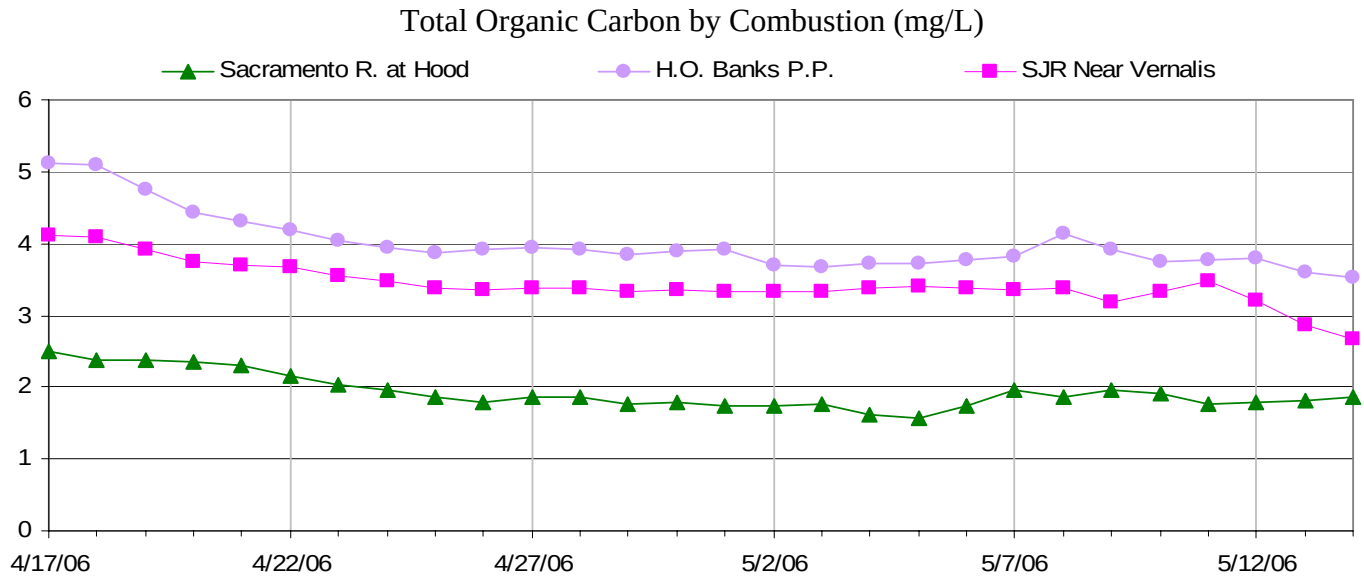
San Joaquin River Electrical Conductivity (µS/cm)



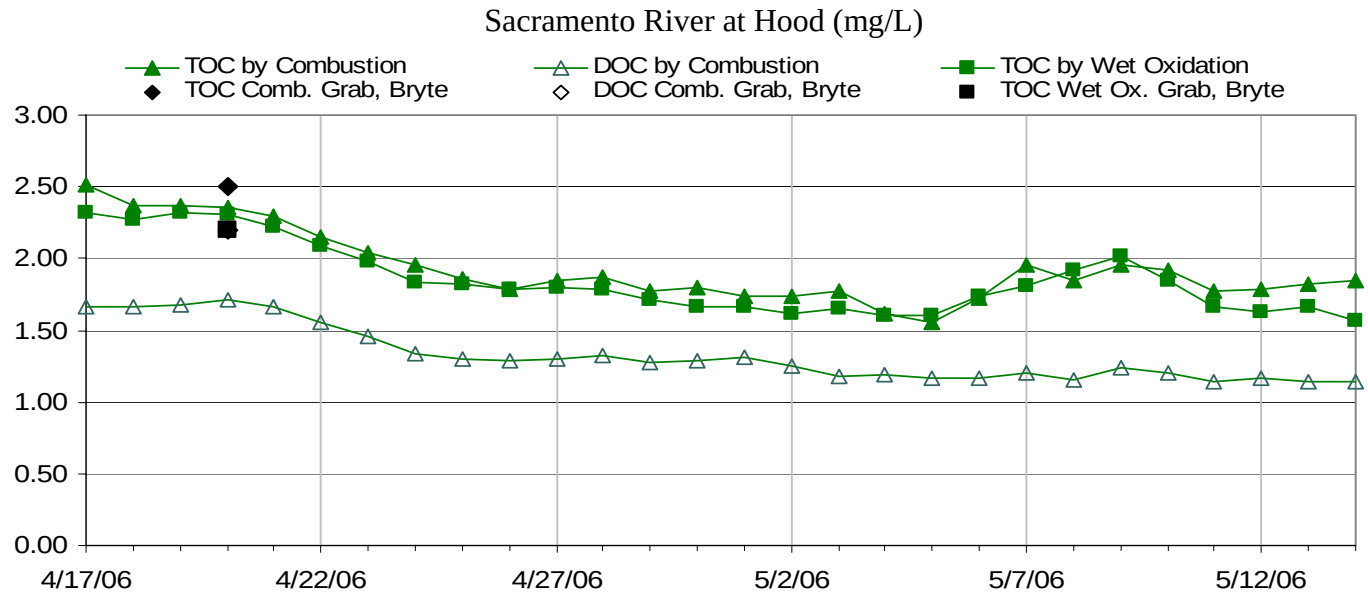
8. Flow, EC & TOC—Sacramento-San Joaquin Delta

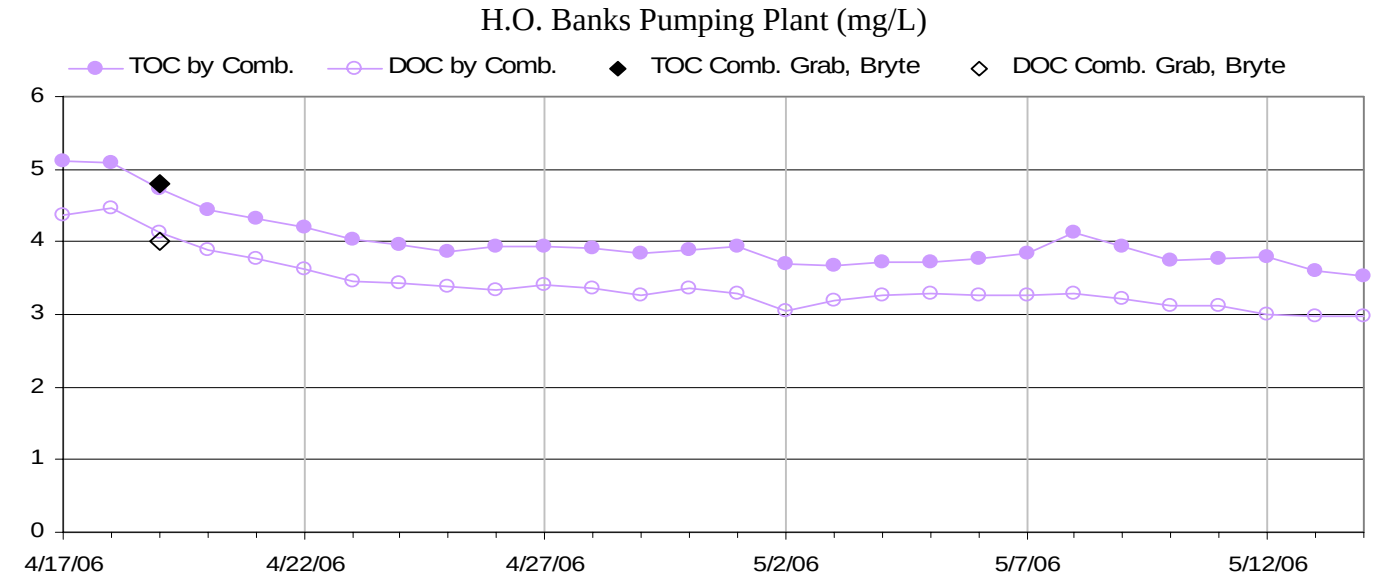


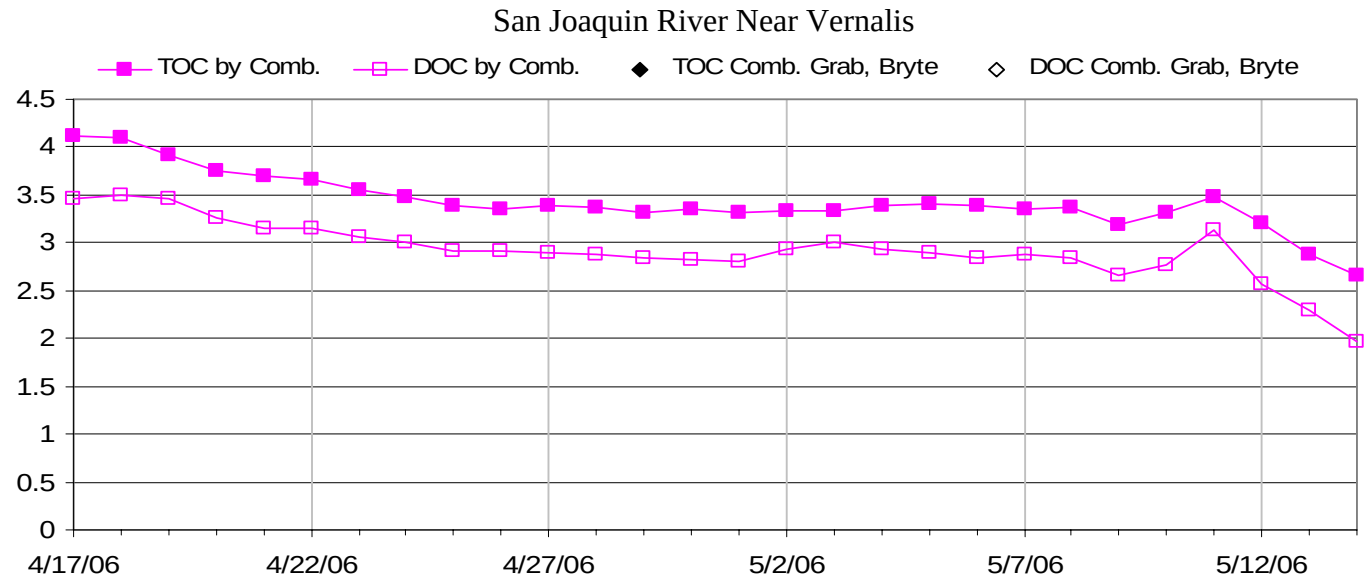




9.Total and Dissolved Organic Carbon

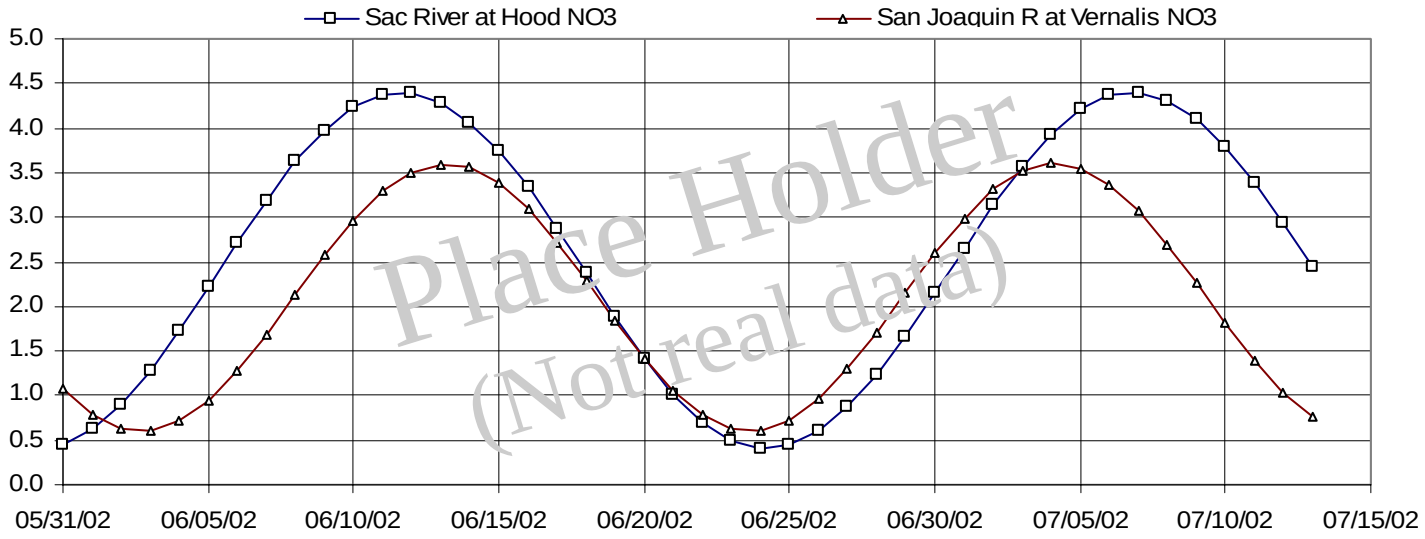




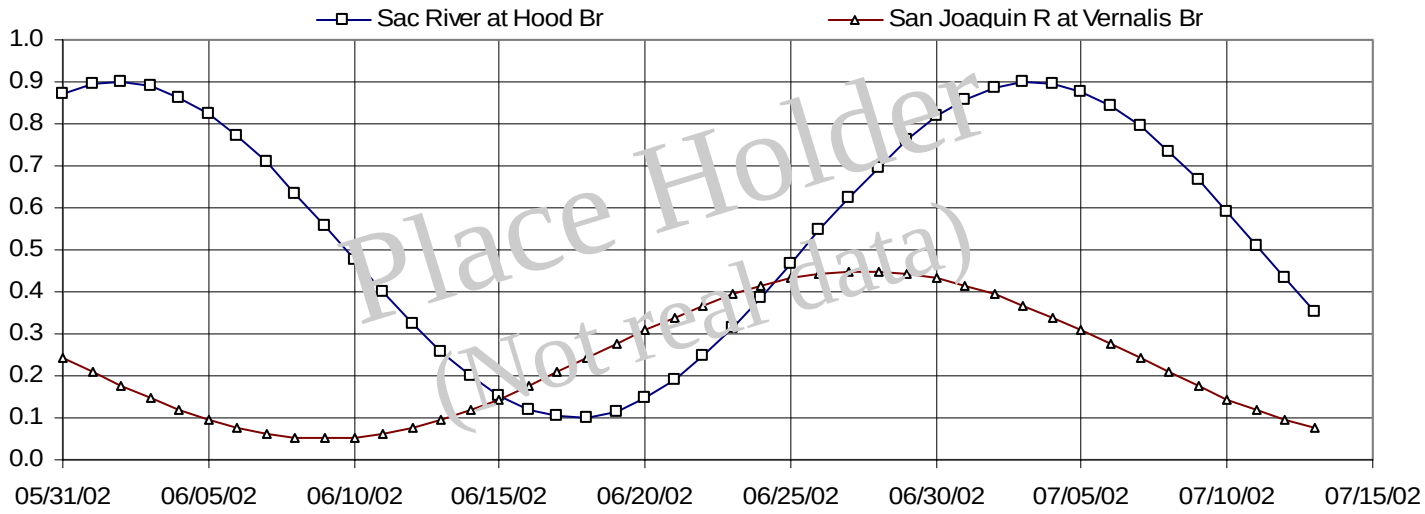


10. Anion Concentrations

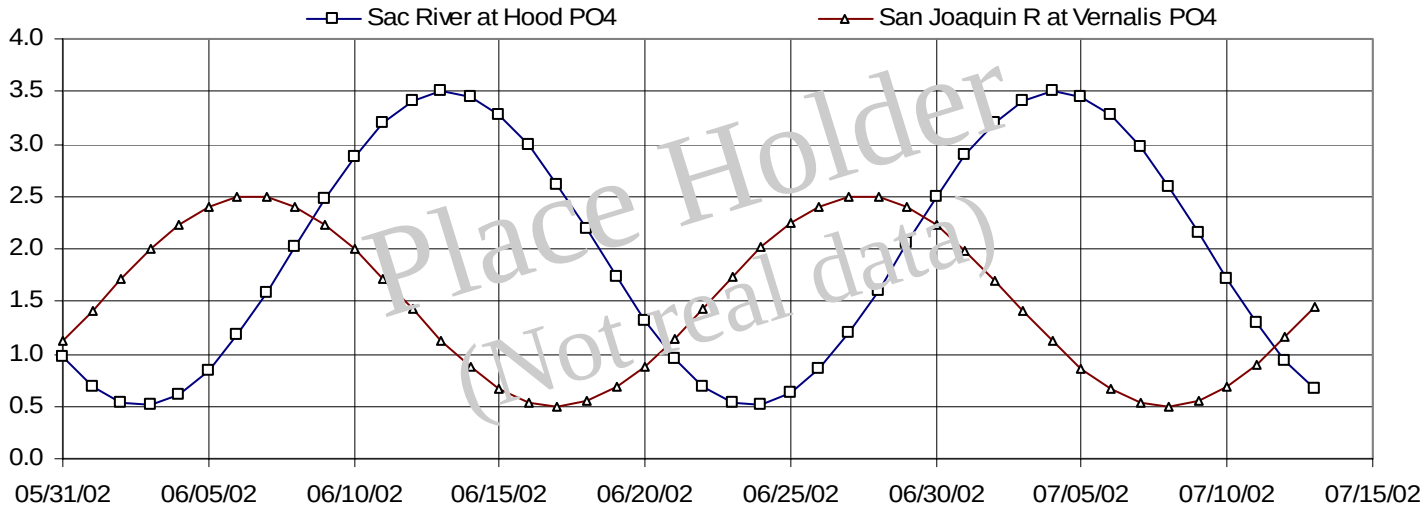
Nitrate ion concentration (ppm NO3)



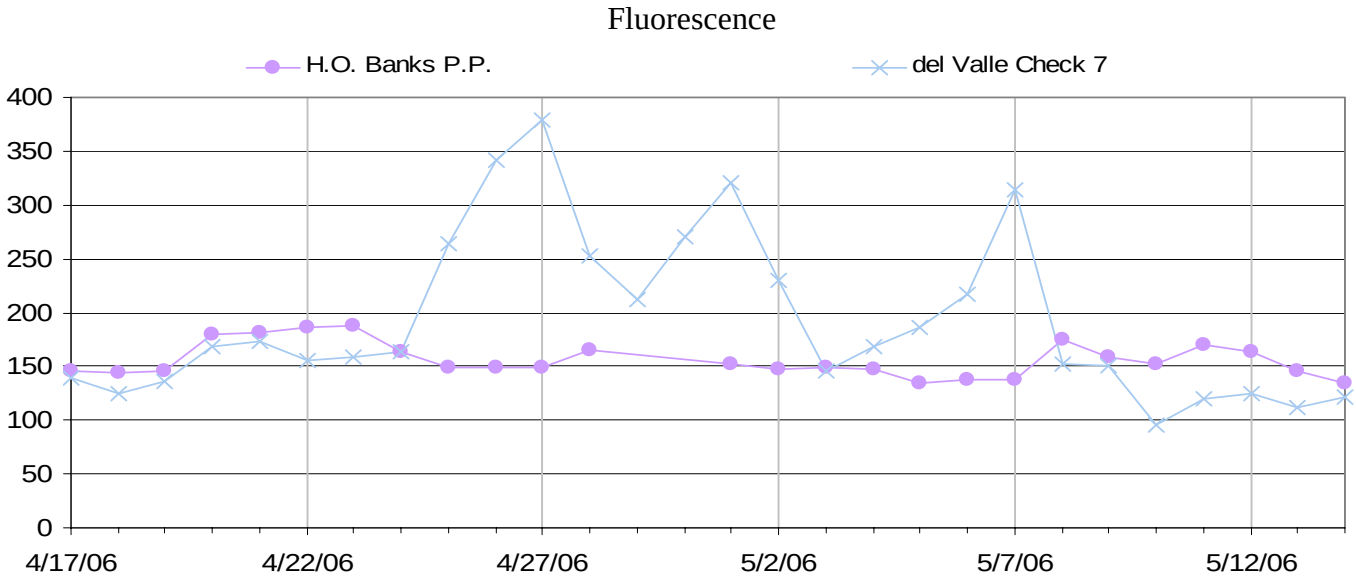
Bromine ion concentration (ppm)

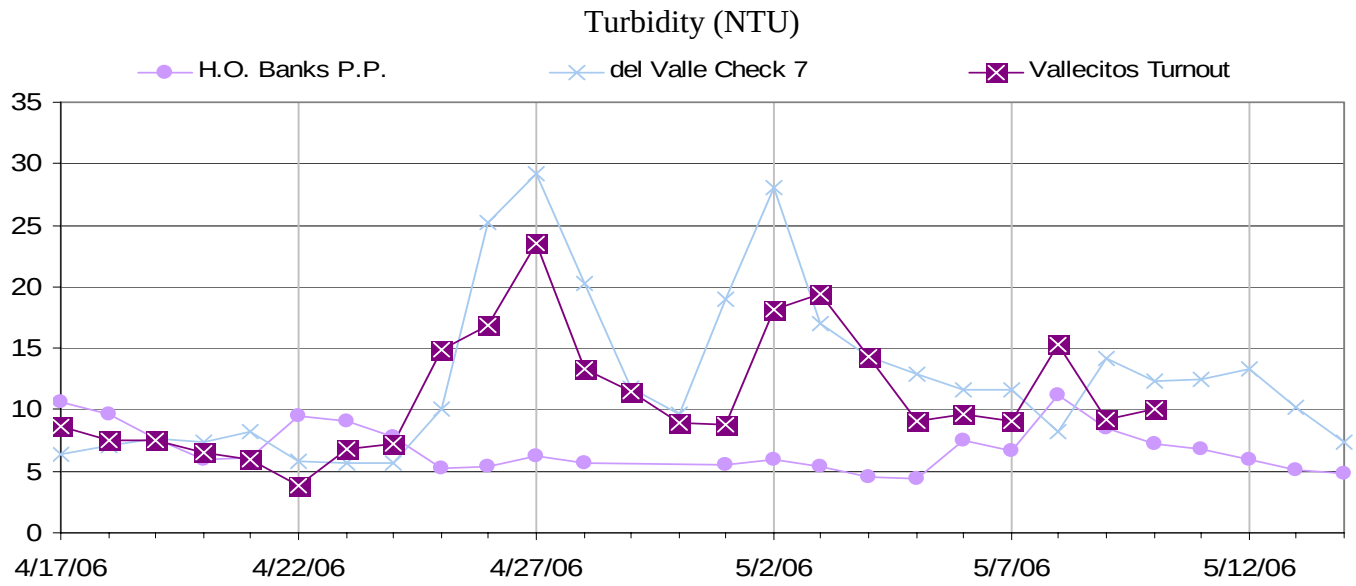


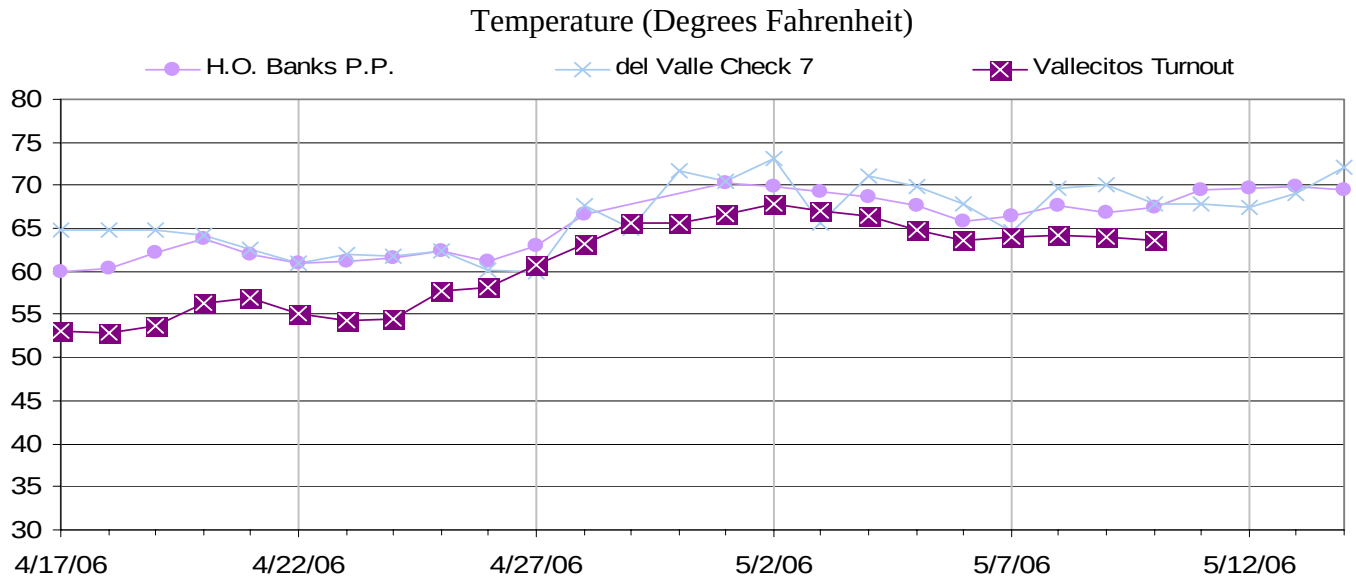
Phosphate ion concentration (ppm PO4)



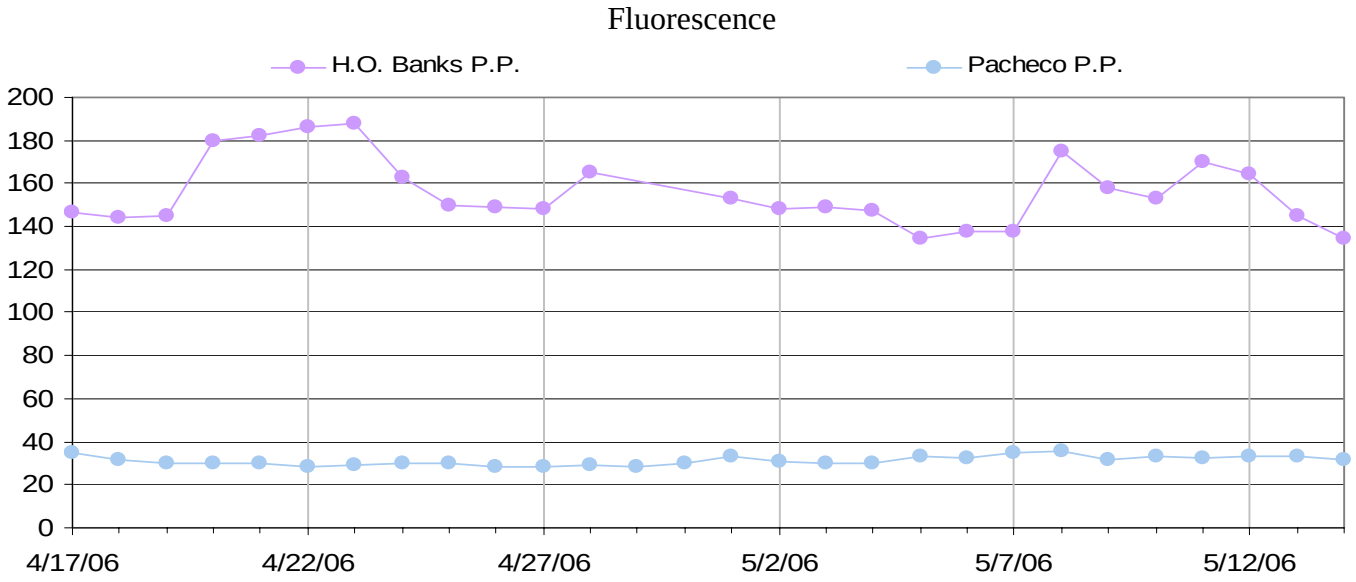
11. Fluorescence, Turbidity and Temperature—SBA

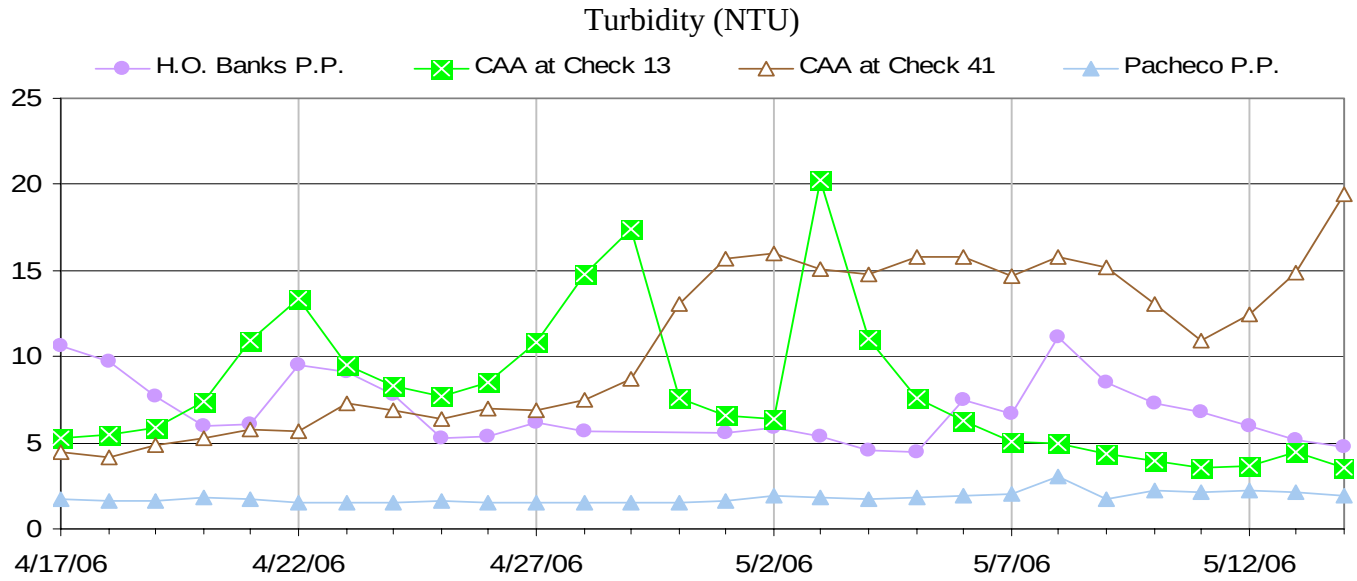


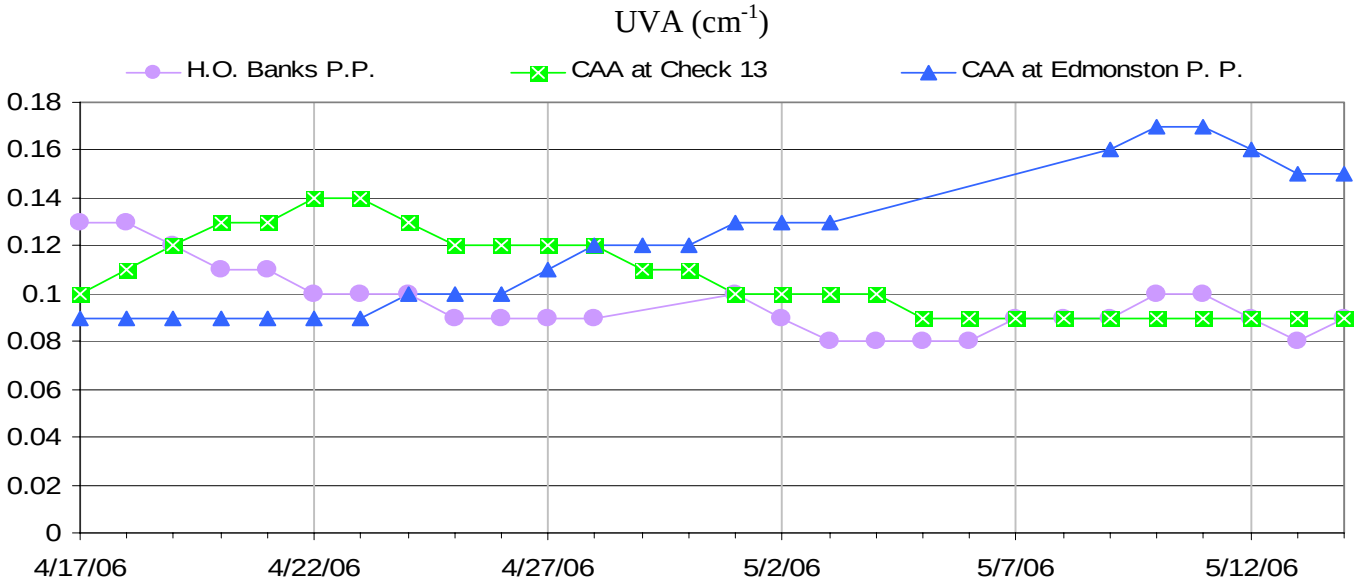




12. Fluorescence, Turbidity and UVA—CAA

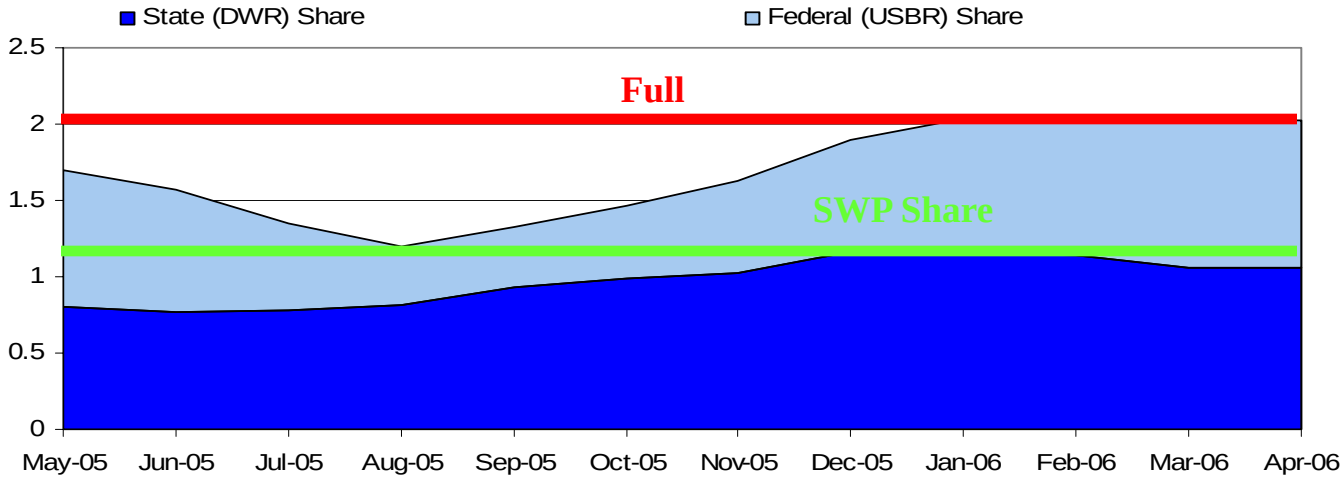




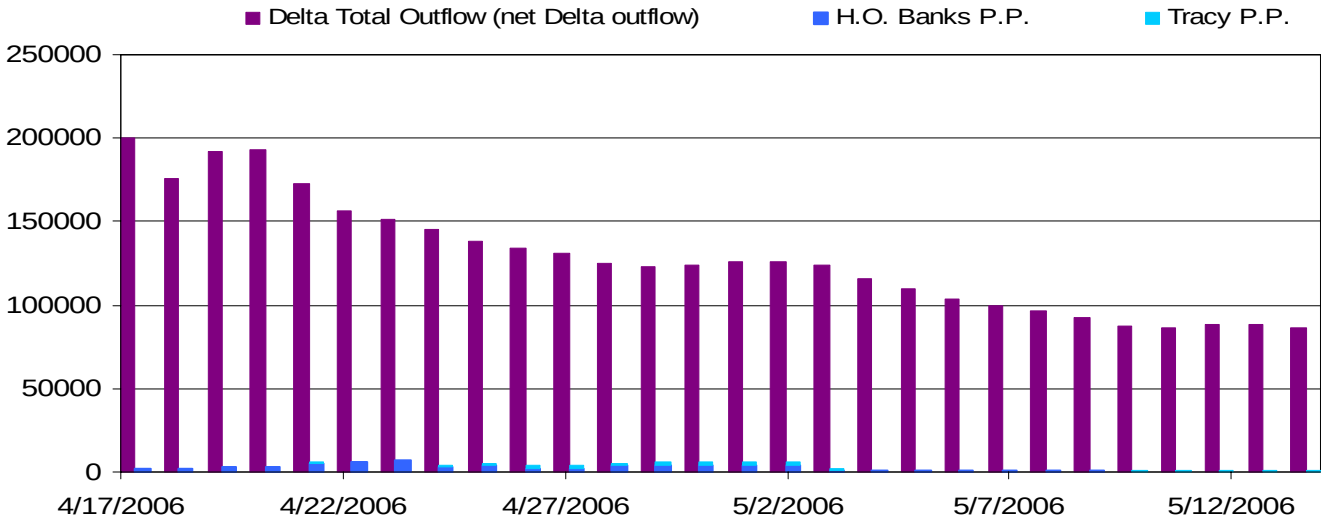


13. San Luis Reservoir Storage & Delta Pumping, Inflow & Outflow

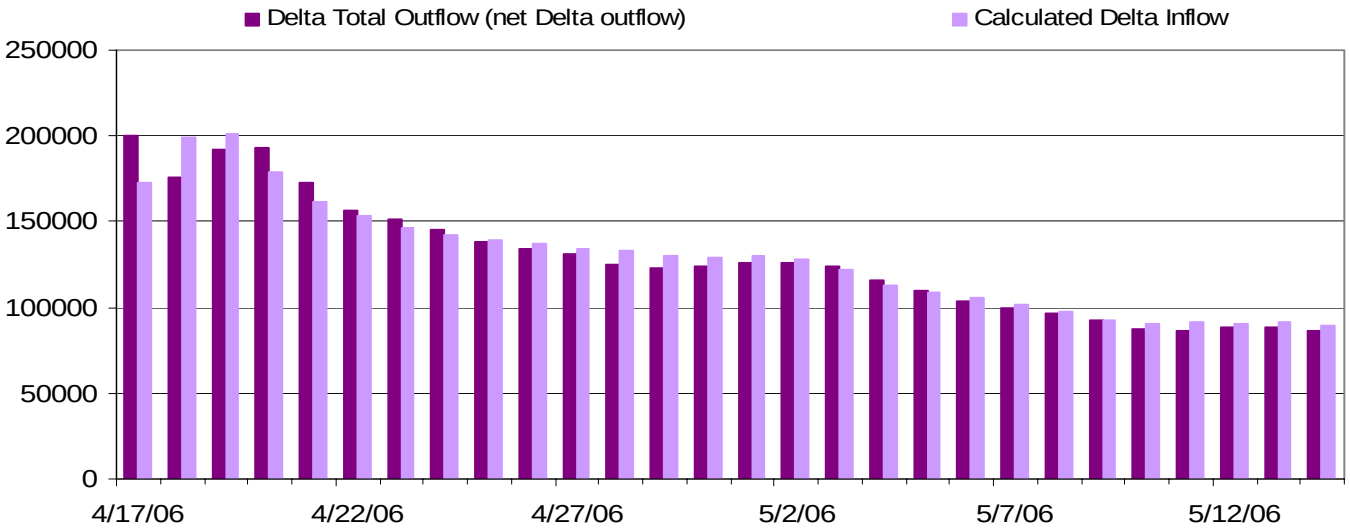
San Luis Reservoir Storage Shares (in millions of acre feet)



H.O Banks and Tracy Pumping plus Delta Total Outflow (cfs)



Calculated Delta Inflow and Delta Total Outflow (cfs)



14. Delta Operations

PRELIMINARY DATA, SUBJECT TO REVISION WITHOUT NOTICE

EXECUTIVE OPERATIONS SUMMARY, May 15, 2006

SCHEDULED EXPORTS FOR TODAY
Clifton Court Inflow = 700 cfs*
Tracy Pumping Plant = 800 cfs*
* Exports reduced for VAMP (Vernalis Adaptive Management Plan)

ESTIMATED DELTA HYDROLOGY
Total Delta Inflow ~ 89,000 cfs
Sac River = 55,635 cfs
San Joaquin River = 26,865 cfs

DELTA OPERATIONS
Delta Conditions = Excess Condition.
Delta Cross-channel Gates: Closed
Outflow Index ~ 85,000 cfs
% Inflow Diverted ~ 1.7 (using 3-day avg).
X2 Position <56.0 km

RESERVOIR STORAGE (AS OF MIDNIGHT)
Shasta Reservoir = 4,331 TAF
Folsom Reservoir = 826 TAF
Oroville Reservoir = 3,298 TAF
San Luis Res. Total = 1,908 TAF
SWP Share = 979 TAF

DELTA SMELT
Daily Expanded Salvage = 0
May Total Salvage = 0
DSRAM adult to date from Dec = 336
DSRAM juvenile concern level = N/A
DSRAM adult concern level = 143
Re-consultation level for May = 37800

RESERVOIR RELEASES
Keswick = 12,000 cfs
Nimbus = 11,000 cfs
Oroville = 14,000 cfs

15. Acknowledgments

Data for this report has been provided by:

California Department of Water Resources

Division of Environmental Services
Office of Water Quality

Division of Flood Management
California Data Exchange Center

Division of Operation and Maintenance
Environmental Assessment Branch
Operations Control Office
Field Divisions

Division of Planning and Local Assistance
California Irrigation Management Information System
Northern District
San Joaquin District

United States Department of the Interior

Bureau Of Reclamation

U.S. Geological Survey

National Oceanic and Atmospheric Administration

National Weather Service